

REMARKS

Claims 1-69 were pending. All stand rejected. Claims 1-3, 7, 9-13, 56-58, and 60-69 are amended, while claims 16-55 are canceled. Therefore, claims 1-15 and 56-69 are currently pending. The applicants request further examination and consideration in view of the amendments above and remarks set forth below.

Claim Amendments:

Independent claim 1 is amended to recite that the nodes of the wide area file system store replicas of objects, the objects being files and file directories. This amendment is supported by the applicants' specification at least at page 11, in the section entitled "Pervasive Replication," which explains that a directory is treated as a file with special contents and that a replica of a file or directory is created whenever and wherever it is accessed. Amended claim 1 also recites that for each replica of an object at a node, a parent directory for the object is replicated at the node. This feature is supported by the applicants' specification at least at page 15, in the section entitled, "Name-space containment," which explains that for every replica of a file, its parent directories are also replicated at the nodes. In addition, amended claim 1 recites that updates to file directories are propagated to other replicas via a graph, wherein each replica of the file directory has edges to only a subset of the other replicas such that all replicas are connected via the graph. This feature is supported by the applicants' specification at least at page 22, lines 15-19, which explains that an edge represents a connection between replicas, that updates flow along edges and that the replicas and edges comprise a strongly connected graph. The applicants' specification at page 27, line 23, to page 28, line 28, explains the graph connections in more detail with reference to Figure 2. Finally, amended claim 1 recites that in response to receiving a propagated update to a replica of the file directory at a node, the replica for the file directory is updated at the node. This feature is supported by the applicants' specification at least at pages 32-33 in the section entitled, "Propagating updates."

Independent claim 56 is amended similarly to claim 1. The dependent claims are amended to be consistent with the independent claims. Particularly, dependent claim 10 is amended to recite that the replicas of a file directory include core replicas and non-core replicas, the parent directory for the file directory having edges only to the core replicas

of the file directory and each core replica of the file directory having edges to one or more of the non-core replicas of the file directory. These features are supported by the applicants' specification at least at page 27, line 23, to page 28, line 28, which explains the graph connections in more detail with reference to Figure 2, and at page 26, line 16, to page 27, line 5, which explains the use of core replicas (i.e. gold replicas) and non-core replicas (i.e. bronze replicas) and registration of the core replicas in parent directories. Dependent claim 11 is amended to recite that in response to a user accessing an object at a node when no replica of the object exists at the node, the method further comprises steps of forming a non-core replica of the parent directory for the object at the node and forming a non-core replica of the object at the node. These features are described in the applicants' specification at least at pages 34-38 in the section entitled, "Creating a replica."

No new matter has been entered.

Objection to the Drawings:

The drawings were objected to as failing to comply with 37 CFR 1.84(p)(4) on the grounds that the reference characters 405, 410 and 455 of Figure 15 are not mentioned in the specification.

The applicants have amended the specification at pages 35 and 36 to include the reference characters 405, 410 and 455. This portion of the specification is clearly referring to Figure 15. See, applicants specification at page 34, lines 13-14. Accordingly, the amendments to the specification do not introduce new matter since they merely make the specification consistent with the drawings. As stated in the Manual of Patent Examining Procedure (MPEP), the information contained in any one of the specification, claims or drawing of the application as originally filed may be added to any other part of the application without introducing new matter. MPEP at Section 2163.06 (8<sup>th</sup> Ed. Aug. 2006).

In view of the above, the applicants respectfully request that the objection to the drawings be removed.

Rejections under 35 U.S.C. § 112:

Claims 60-64 and 67-69 were rejected as being indefinite on the grounds that they recite the “method” whereas these claims depend from a system claim. The applicants have amended claims 60-64 and 67-69 to instead recite the “system.”

In view of the above, the applicants respectfully request that the rejections under 35 U.S.C. § 112 be removed.

Rejections under 35 U.S.C. § 102(b):

Claims 1, 10 and 11 were rejected under 35 U.S.C. § 102(b) as being anticipated by Popek et al., “Replication in Ficus Distributed File Systems” (hereinafter, “Popek et al.”).

The applicants respectfully submit that amended claim 1 is not anticipated by Popek et al. Popek et al. describes a distributed file system, referred to as “Ficus.” See title of Popek et al. However, Popek et al. does not disclose a graph structure as recited in applicants’ claim 1 in which each replica of a file directory has edges to only a subset of the other replicas such that all the replicas of the file directory are connected via the graph. For at least this reason, claim 1 is allowable over Popek et al. Claims 10 and 11 are dependent from an allowable base claim 1. For at least this reason, claims 10 and 11 are allowable.

Further, claim 10 recites that the replicas of a file directory include core replicas and non-core replicas, the parent directory for the file directory having edges only to the core replicas of the file directory and each core replica of the file directory having edges to one or more of the non-core replicas of the file directory. Popek et al. does not disclose such core and non-core replicas, nor does Popek et al. disclose a parent directory having edges only to such core replicas. These are additional reasons why claim 10 is allowable. These are also additional reasons why claim 11 is allowable, being dependent from claim 10.

In addition, claim 11 recites that in response to a user accessing an object at a node when no replica of the object exists at the node, the method further comprises steps of forming a non-core replica of the parent directory for the object at the node and forming a non-core replica of the object at the node. Popek et al. does not disclose these features either. This is another reason why claim 11 is allowable.

Rejections under 35 U.S.C. § 103:

Claims 2-9, 16-26, 32, 33, 35-46, 52, 53 and 55-66 were rejected under 35 U.S.C. § 103 as being unpatentable over Popek et al. in view of Zhang et al. “Designing a Robust Namespace for Distributed File Services”(hereinafter, “Zhang et al.”).

Claims 16-26, 32, 33, 35-46, 52, 53 and 55 are canceled. Accordingly, the rejection is moot as to those claims. Claims 2-9 are dependent from claim 1, which is allowable. Accordingly, claims 2-9 are allowable.

Claim 56 is amended to recite that each replica of a file directory has edges to only a subset of the other replicas of the file directory such that all the replicas of the file directory are connected via the graph and the nodes are configured to propagate updates to replicas of each file directory to other replicas of the file directory via the graph. As explained above in connection with claim 1, Popek et al. does not disclose such a feature. Zhang does not disclose this feature either.

More particularly, Zhang et al. is directed toward distributed file services. See Abstract and Title of Zhang et al. It is important to note that Zhang does not discuss file replication except to note (in a footnote) that they consider that replicas of an object correspond to one logical object. Thus, Zhang et al. treats any replicas of an object as a single logical object. From this, it is clear that Zhang et al. does not provide any teaching regarding graphs among replicas or regarding propagating updates to replicas.

In view of the above, claim 56 is allowable over Popek et al. and Zhang et al. Claims 57-69 are allowable at least because each depends from an allowable base claim 56. Further, these dependent claims recite features that are not disclosed by Popek et al. or Zhang et al. For example, dependent claim 65 recites that the parent directory for a file directory has edges only to the core replicas of the file directory and each core replica of the file directory has edges to one or more of the non-core replicas of the file directory. As explained above with reference to claim 10, Popek et al. does not disclose these features. Zhang et al. does not disclose such core and non-core replicas, nor does Zhang et al. disclose a parent directory having edges only to the core replicas. Accordingly, these are additional reasons why claim 65 is allowable. These are also additional reasons why claim 66 is allowable, being dependent from claim 65.

As another example, dependent claim 66 recites that in response to a user accessing an object at a node when no replica of the object exists at the node, a non-core replica of the object and a non-core replica of the parent directory for the object are formed at the node. As explained above with reference to claim 10, Popek et al. does not disclose these features. Zhang does not disclose these features either. This is another reason why claim 66 is allowable.

Conclusion:

In view of the above, the applicants submit that all of the pending claims are now allowable. Allowance at an early date would be greatly appreciated. Should any outstanding issues remain, the examiner is encouraged to contact the undersigned at (408) 293-9000 so that any such issues can be expeditiously resolved.

Respectfully Submitted,

Dated: May 7, 2007

A handwritten signature in black ink, appearing to read 'Derek J. Westberg', is written over a horizontal line.

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